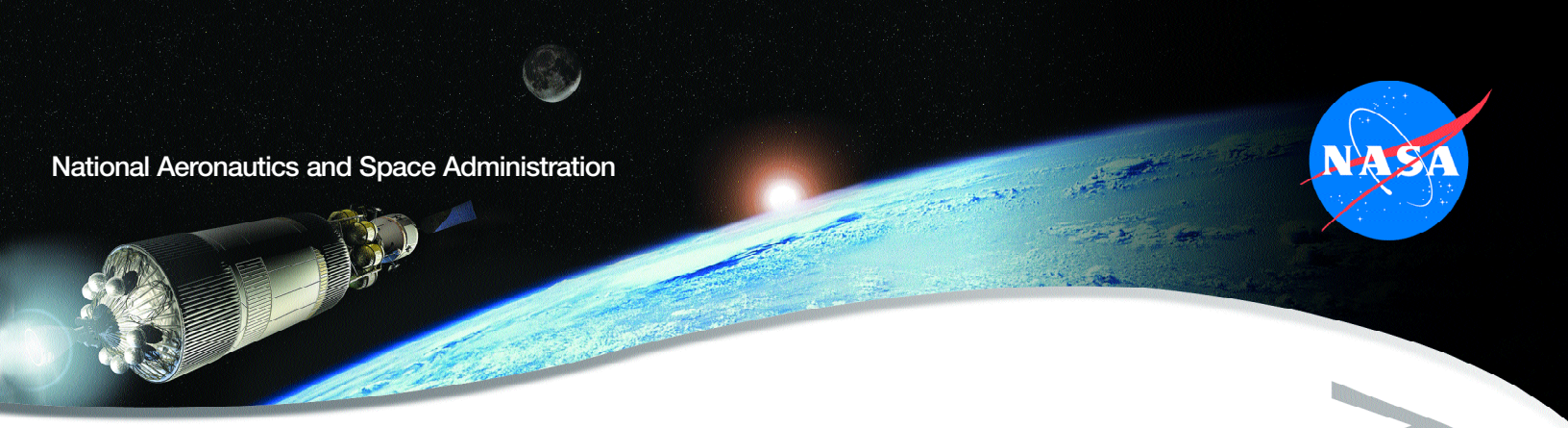

CSTL

Creating an End-to-End IP Communications Environment

goddard technology

About the Lab

The Communications, Standards, and Technology Lab (CSTL) provides a high-fidelity, end-to-end IP communications test and demonstration environment for the NASA Space Communications and Navigation Standards and Technology programs. The CSTL is a prime facility for space communications and navigation studies, Constellation C3I studies, and space network and ground-network prototyping activities. Current activities include software-defined radio development, networking functionality demonstrations, flight-software application development, and ground implementations. The testbed is currently configured to demonstrate IP communications for the Orion Crew Exploration Vehicle and Lunar Surface Access Module.

Benefits of the Technology: At-A-Glance

Provides a high-fidelity, end-to-end, and mission-like environment that supports:

- Standards development and testing
- Technology development and testing
- Constellation/C3I trade studies
- Communication and tracking network studies

Significance of the Lab

The high-fidelity of the flight and ground hardware and software components and the flexibility to test end-to-end give GSFC a unique capability to support the development, testing, and demonstration of standards, new technologies (in a variety of space disciplines), Constellation trade studies, and communication and tracking network studies, all in one place.

Origins

The Goddard Flight Software and RF Systems Laboratory combined to create an end-to-end IP-based communications testbed. The lab included a single spacecraft-to-ground station and incorporated a Cisco-embedded space router. In November 2006, the lab integrated an additional hop to a second spacecraft, basing the configuration on Constellation C3I interoperability specifications.

Looking Ahead

Future activities include:

- COmmunications Navigation NEtworking reConfigurable Testbed (CoNNeCT)
- Inter-Center Space DTN Readiness Project
- External interfaces with JSC OTF, JPL Protocols Test Laboratory, Distributed System Integration Lab (DSIL), and Vehicle Avionics Integration Lab (VAIL)
- Networking functionality demonstrations/tests, including Delay/Disruption-Tolerant Networking (DTN), dynamic routing/mobile IP, IP security, IPv4/IPv6 comparisons, and communications testing
- Constellation prototype RF hardware
- Integration with Goddard's GMSEC
- Standards testing, including Asynchronous Message Service (AMS) and Space Link Extension (SLE)

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